

# Method and apparatus for display of windowing application programs on a terminal

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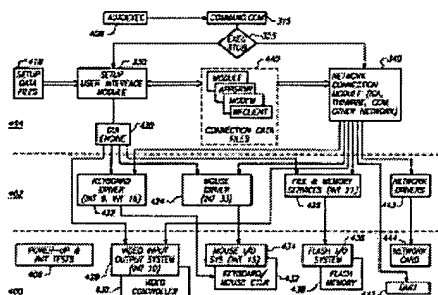
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## Abstract of US5918039

A video display terminal capable of operating with a graphical user interface such as Windows TM provides windowing functionality to permit use of popular applications programs resident on a server, without requiring more than application data to be transmitted from the server, and keyboard and mouse information to be transmitted from the terminal to the server. In addition, a method for updating terminal operating characteristics over a communications link from a host is disclosed. Finally, method and apparatus are disclosed for implementing multiple personalities within a terminal and switching among such personalities.



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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention about the method and device for displaying information on a terminal especially, On a terminal, it is Microsoft Windows. Graphic user interfaces, such as an application program within an operating environment (registered trademark) and its environment, are formatted, and it is related with the method and device for displaying further.

[0002]

[Description of the Prior Art] Microsoft Windows Graphic user interfaces, such as an operating environment (registered trademark), comprise an operating environment through which it has spread for application software best-selling all over the world most. Such environment is generally liked by the homogeneity of not only other reasons but the ease of using and a user interface, the height of display quality, etc.

[0003]

[Problem(s) to be Solved by the Invention] However, such user environment was designed so that it might be used with a workstation and microcomputers, such as a personal computer. Although such a workstation and a microcomputer are flexible, security, reliability, the ease of management, and a price have a difficulty. Although providing the advantage of the ease of the security protection and management which have been improved compared with a microcomputer is known and the price of a data terminal is usually still cheaper, generally the terminal cannot provide compatibility with the graphic user interface which has spread most. Although the X environment can provide several kinds of graphic user interfaces which are operating under Unix (registered trademark), it can generally be expensive and can need an expanded memory, and most compatibility with the Windows environment which has spread further most cannot be found.

[0004] Another choice known for conventional technology is diskless PCS. However, diskless PCS has an insufficiency of a number of points. Diskless PCS which is operating according to client server environment in almost all examples displays application program information by downloading an application program from the server and executing the application program locally. The thing in which diskless PCS is going to perform this and for which it has all the required throughput for every application is required of diskless PCS. In today's environment, this requires not less than 8 MB of memory, a powerful processor, etc., and makes diskless PC expensive. Diskless PCS has restrictions in security, and may need excessive management. Windows which a

Windows NT (registered trademark) operating system provides strong network client environment, and has spread Environment (registered trademark) and the compatibility in an application program level are also provided. However, the NT operating system is written to PC clients, and is not an object for terminals. As a result, NT client generally becomes expensive in good health therefore. Furthermore, Windows NT is written to client server environment, and is not an object for multiuser environments. Although the application of the conventional technology for WinFrame is a PCS client which stands face to face against a terminal, these days the WinFrame operating system provided by Citrix Systems, A Windows NT operating system is changed, and it is extending so that it may operate by multiuser environments.

[0005] Therefore, it is not comparatively expensive and is reliable, and it is easy to manage, secrecy is held and there are needs for terminals which can display application program information within a multiuser Windows operating environment (registered trademark) from before further.

[0006]

[Means for Solving the Problem] Although this invention provides precise and brief solution over a fault of conventional technology, this invention provides a terminal which can display application software which is compatible with windowing environment and which is not expensive. Especially this invention provides a display terminal which is operating a multiuser operating system and in which an application server and communication are possible. This enables it to access certainly with disk top Windows application. In illustration composition, an application server is formed in a form of arbitrary suitable computers where a WinFrame<sup>TM</sup> operating system provided by Citrix Systems is operated. The WinFrame<sup>TM</sup> operating system, a Windows NT operating system, and expanded function that mount not only a multiuser function but a display protocol known as ICA-3 are built in.

[0007] The terminal is Intel X86 in a certain example. It has the hardware architecture of a processor system. A program which the terminal provides only with limited main memory and through which word processing, graphics, a database, or others have spread, Or it is common that local execution of the newest application programs, such as Windows or the DOS operating system itself, cannot be performed. Thus, a terminal of this invention differs from an X terminal of conventional technology, diskless PCS, or other PCs that were constituted by client server environment clearly. As for an important thing, the hardware architecture does not mount the conventional IBM PC/AT bus, and firmware within the terminal is not mounting a standard PC/AT BIOS and standard PC compatible disc operating system, either. The terminal firmware is provided with network access expanded function which are compatible with an application server, for example, ICA-3 expanded function available from Citrix Systems. Common input/output devices in the Windows environment, for example, a mouse, a keyboard, Having a touch screen, not only other input-and-output services, etc. but a high resolution graphic display for the ease of using, the display is black and white (a gray scale is included) or a color.

[0008] The terminal includes a network interface which can communicate with an application server through conventional RS-232C port, Ethernet connection, radio function, ISDN, optical fiber, AC power line modem, cable, or other connecting means. if connected to the application server, the terminal operates on the server and contains

arbitrary application programs accessed by user of the terminal -- Windows NT or a Windows 95 operating environment is displayed. In the illustration arrangement, for the user, the terminal is still more expensive, is low, and looks the same intrinsically with a personal computer which is further hard to manage. [ of confidentiality ] As a result, a terminal of this invention provides a function of a large number relevant to a multiuser system, and also usually provides a desirable function of general a large number by client server environment simultaneously working.

[0009]It is the availability of client independence within the 1st function of this invention, and the Windows environment. That is, by a system by this invention, a user defines his operating environment and the environment follows the user to all the corners of the system further. Therefore, a user logs on to a certain terminal, can define environment and can log on to another terminal. The 2nd terminal displays automatically environment which the user defined by the first terminal. In addition to display ability of application program information, a terminal of this invention has the setting-out mode in which a user can constitute various aspects of the terminal of operation. In order to make it a terminal of this invention follow a command sent from a server which is operating WinFrame, a terminal operating system of the specific purpose was developed, but. It emulates a call to the conventional PC operating system, or corresponds. A kernel which loads command software which initializes a system, includes a PUTO block for starting, and includes an additional driver and changed loading of a WinFrame client code in the block follows the terminal operating system. Execution of the changed WinFrame client includes connecting with an application server.

[0010]In the Microsoft Windows environment, to display ability of application display information, in addition, this invention, The capability to communicate with other servers or a host who is operating a non-Windows operating system is also included by including other permanent residence terminal emulation or personalities who have the capability to a "hot key" switch in various personalities. Another feature of this invention is equipment of a graphic user interface for composition of a terminal and a task managed locally [ others ]. Two or more windows are used especially for the graphic user interface, and each window enables reconstruction of the one or more terminal characteristics and other local tasks. A selection object which may be constituted in the window is arranged in a group of each window. Whether these selection objects that a user can choose being displayed through pulldown or same menu, and a display are possible. Various data structures are related with a different group of a type and a selection object.

[0011]Other features of this invention are saving a terminal operating system at a flash memory. The flash memory is updated by various methods, and the method is communication via suitable interfaces, such as a parallel port when the terminal is placed by predetermined state, a serial port, or a network adapter, for example. Therefore, information generated by an application server with which the 1st purpose of this invention is executing a diffused application program which is operating under a Microsoft Windows NT (registered trademark) operating system, It is offer of a terminal which can be displayed. The purpose of another this invention is offer of a terminal configuration system which has a graphic user interface for constituting a terminal operating system.

[0012]The purpose of other this inventions is offer of a terminal for displaying application program information which emulates a client personal computer in client

server environment. The purpose of another this invention is offer of a terminal which generally has the function which combined a desirable function relevant to multiuser computing environment, and a desirable function relevant to client server environment. The purpose of other this inventions is one side, and is offer of a terminal operating system which enables communication with a window operating environment simultaneously, operating non-standard PC/AT BIOS and non-standard [ PCDOS ]. The purposes of another this invention are a device for updating the terminal operating system quickly and conveniently, and offer of a method.

[0013]The purpose of another this invention is to provide a multiplex permanent residence type personality for terminals who has various personalities' quick change function, without intercepting exchange of an expansion card and a power supply of the terminal. The purpose of these or other this inventions should become still clearer by the following detailed explanation of this invention with an accompanying drawing.

[0014]

[Embodiment of the Invention]

[0015]

[Example]Reference of drawing 1 shows the simplified system about this invention. Especially the single application server 10 communicates with the one or more terminals 12 in both directions via a suitable NETO work or other communication links 14. Other suitable links, such as Ethernet connection of RS232 circuit, an AC power line modem, a twisted pair, or a coaxial cable or an optical fiber, may be sufficient as the network link. In arrangement of the illustration decided to operate to satisfaction, an application server, Although provided by Citrix Systems, such as a WinFrame operating system, the operating system of Windows NT [ like ] (registered trademark) etc. which have suitable expanded function is operated. A true multiuser function is provided under a Citrix remote Windows protocol or expanded function, and the Windows NT environment. For such composition, an application server, for example, Intel Pentium which has a suitable quantity of RAM or a 486 processor -- or -- The personal computer based on other same processors, such as DEC Alpha or a MIPS processor, or a multiprocessor may be used. In the composition of illustration, the server has RAM of one to 8 MB per simultaneous user according to 16 MB of RAM for WinFrame<sup>TM</sup> operating systems, and the specific application which the user is operating.

[0016]The application server 10 can communicate with the NetWare file server 16, the Unix host 18, other personal computers 20, or other servers containing the Internet gateway 22 in suitable composition. The application server 10 can communicate also with the remote dialup user 28 by the remote terminal 26 or other means via connection of everything but a router or other communications server 24 grades. Next, if drawing 2 is referred to, the hardware architecture of the terminal by this invention should be able to understand still better. being a microprocessor of an x86 family and usually setting in the example especially, -- 80386CXSA -- or -- CPU100 which is '486SXLC receives a clock and a reset signal from the clock & reset logic circuit 102. The CPU is address bus 105, data bus 106, and CTRL bus 108 course, and communicates with other logic circuits. It is important that the buses 105, 106, and 108 usually have compatibility in neither an IBM PC/AT standard nor other personal computer standards.

This is because it has intention of this invention even if it is not all relevant to the personal computer which is operating by the network environment so that many traps

may be avoided.

[0017]Especially the address bus 105 is extended from CPU100 not only to the flash memory array 112 and VGA controller 114 but to control ASIC110. The data bus 106 communicates with control ASIC110, VGA controller 114, and the memory array 116 similarly. The CTRL bus 108 supplies a control signal to ASIC110 and VGA controller 114 similarly, and the other logic circuits 118 supply CONFIG, IDCS, and DIAGCS to ASIC110. It is a DMA bus course, and ASIC110 communicates with the memory array 116, it is PD bus 122 course and communicates also with the flash memory 112. The PD bus 122 also provides the means of communication not only between the LAN controller 128 but ASIC110, the flash memory 112, the serial I/O & parallel controller 124, and the keyboard & mouth controller 128. ASIC outputs a FCS signal to the flash memory 112, outputs RAS, CAS, and WE signal to the memory array 116, and outputs COM1, COM2, and a PPCS signal to the SIO controller 124. The ASIC110 outputs a KBCS signal to the keyboard & mouth controller 126, and outputs a NETCS signal to the LAN controller 128. Finally, the ASIC outputs the speaker enable signal SPEN to the speaker 130.

[0018]CPU100 communicates with the SIO controller 124, the keyboard & mouth controller 126, and the LAN controller 128 via a part of bus 105. ASIC110 Hardware interrupt INTA, INTB, And INTP is outputted to a SIOR controller, and hardware interrupt KBINT and MSINT are outputted to the keyboard & mouth controller 126, and hardware interrupt NINT is outputted to the LAN controller 128. Although it is usable in a certain example also with the memory of other types, the memory array 116 usually comprises a DRAM memory. However, the quantity of DRAM [ in / unlike the present personal computer / the array 116 required for terminal operation ] is within the limits of 4 MB from 512KB. In an example, memory address wiring of 23 and byte selection wiring of one were used, and this has restricted memory space to 16 MB. In other examples, it is selectable in the memory space of a different size.

[0019]Control ASIC110 is provided with bus control, the DRAM controller (usually fast page mode with interleave), the system timer, the speaker timer, and the functional block for I/O controllers in a certain example. The control ASIC is mounted as a gate array or other high integration elements, and is explained in more detail in relation to drawing 3. In a certain example of operation, the capacity of a flash memory may have a desirable size of not less than 5 MB in; with which come out enough by a 512KB grade and a certain thing is indicated to be, however other applications. In a suitable example, although the array 112 comprises a flash memory, even if it compares and the array is EPROM and SRAM, or other equivalent memory devices, the substantial function of this invention is maintained in a certain example.

[0020]The SIO controller 124 is COM1. 1 3 2 and COM2 1 3 It communicates with 4 and the printer (or parallel) port 136. 16552 available devices may be sufficient as the SIO & parallel controller 124 from Startech. The keyboard & mouth controller 126 communicates with LAN interface 142, although it communicates with the keyboard 138 and the mouse 140 and a LAN controller does not need to be formed in all the examples on the other hand in a similar manner. In a certain illustration prototype, the keyboard & mouth controller 126 is a standard keyboard controller.

On the other hand, the keyboard and mouse are based on the PS/2 standard.

At least, in two or more of a certain examples, the keyboard controller is changed, as

there are the 4-wire system keyboard interface and compatibility which are described by United States patent 4,706,068th. Finally, arbitrary suitable network interface controllers may be sufficient as a LAN controller, and it is easy to be the thing based on the permitted arbitrary network standards having contained IOBase1, IOBase2, and others. The network interface has a good thing with the memory more than 512KB because of additional code memory.

[0021]An image and the graphics controller 114 are MPS148 courses, and are functionally related to the 2nd memory array 144 for saving the image and graphic information which are supplied to the monitor 146. For example, in order to equip with the image controller 114 the high resolution display which Cirrus 5429 with internal RAMDAC may be sufficient as, for example, is compatible with a VGA standard at least, it may have 1 MB or more of video memory. In order to display a Windows application program, a clearly small thing has a sum total memory clearer to a person skilled in the art than the object for personal computers which has the same function demanded. The sleeve signal 150 is supplied from ASIC110. A large number [ the method for carrying out a sleeve signal ]. For example, in the black and white version of this invention, a signal is supplied to the power supply of the monitor, makes a video signal impossible of operation, and lowers the power consumption of the monitor power supply. In the color version, a synchronized signal is dealt with based on a VESA standard so that the electric power of the monitor may be reduced. In the future, probably, it will be clear to a person skilled in the art that a majority of these functions may be included in one or more VLSIs, such as ASIC, a gate array, or other elements, including CPU.

[0022]As a special function of the hardware of this invention, the terminal operating system saved at the flash memory 112, It may be updated by various methods including the communication through suitable interfaces, such as a network adapter of the parallel port 136, the serial port 132, 134, or LAN interface 142 grade. In a certain example, a flash memory is updated through communication with a host system by, for example, adding a loopback plug, suitable key sequence, or other suitable methods, when the terminal changes into a predetermined state. In such a combination, the download to the memory system of a terminal is attained and communication with a host is also allowed simultaneously. Next, a host outputs the updated operating characteristic to DRAM116 of a terminal, or the flash memory 112 directly via a communication link. Therefore, the updated operating system information is saved at the flash memory 112 if needed, and a terminal is returned to the normal operating state which is not downloadable.

[0023]On condition of usual, the system of drawing 2 starts operation following reset by the start of execution of the boot code saved at the flash memory array 112. The flash memory array 112 is arranged at two banks, and the both are accessed in the predetermined address of CPU memory space, for example, C00000-DFFFFF and E00000-FFFFFF. On the other hand, as shown in the following table 1, in order to provide the great portion of usual PC function, the remainder of memory space is assigned. Probably, in an example, it will be clear to a person skilled in the art to have shifted the image and 8 MB of memory address for graphics from the conventional PC memory address. In such an example, a VGA chip, It is used in "compatible" mode (getting it blocked and a linearity addressing mode turned OFF), Therefore, only the VGA chip answers the frame buffer in A0000h-AFFFFh (in graphics mode), or B0000h-B7FFFh (for MGA modes), or B8 000h-B8FFFh (for CGA modes), and

these addresses, It is shifted to 8A0000h-8AFFFFh etc. Those addresses are shifted in the limit of the bank 0 DRAM, and make possible the emulation of the usual PC function which can fully perform presenting of Windows application program information simultaneously (it explains after this like [ again ]).

[0024]

The bank 0 to a top address range, for example, the boot block of FFC000h-FFFFFFh. It is arranged, two 8-KB parameter blocks are followed, and two or more main blocks (in 1-MB assignment) are further followed to F00000h (as opposed to 512-MB assignment) to address F80000h. The main block of the memory is usually constituted as a file system. The bank 1 of a flash memory is assigned to a file system device, and is usually a range from the address DFFFFFFh to C00000h.

[0025]Next, reference of drawing 3 should understand ASIC110 still better. The clock buffer 160 receives CLK50 signal and supplies a clock signal to the reset synchronous logic circuit 162, the DRAM control logic circuit 164, and the timer control logic circuit 166. The interruption buffer 168 receives INTP, INTA, INTB, MSINT, KBINT, and a NINT signal as shown in Table 2. An interruption buffer outputs two or more signals to the interrupt control logic circuit 170, and the logic circuit 170, A control signal is received from the CPU control input buffer 172, and a timer control signal is received from the timer control logic circuit 166, and the INTR output signal outputted to CPU is generated further. The CPU control input buffer 172 supplies a control signal to the cycle control logic circuit 174, and the logic circuit 174 outputs a control signal to DRAM



control circuits 164 instead. DRAM control circuits 164 receive a refresh signal from the timer control logic circuit 166 --; -- the timer control logic circuit 166 generates the loudspeaker enable signal SPEN.

[0026]In the example, the interrupt control logic circuit 170 operates from a system timer by high frequency not to compatibility with 8259 but to the; said appearance, and the timer control logic circuit 166 operates not from compatibility with 8254 but from an 8254 compatible element. As a result, although the mask of some of the interruption of the twist high frequency sent by the timer control logic circuit is carried out by a kernel, other things pass and bring the usual time between interruption close to an average.

Therefore, it compares, and even when the time during the input by which the emulator was carried out on lower frequency (standard) is not uniform, higher frequency makes the emulation of a standard PC function possible. ASIC110 is provided with the CPU address input buffer 176, and the buffer 176, As shown in Table 2, BE0, BE1, and A1-A23 signal is received, and an output signal is outputted to a memory / IO chip-select control logic circuit 180, and the DRAM memory address multiplexer 178. Its memory / IO chip-select control logic circuit 180 outputs various output signals including FLASHCS0 (FCS0) and FLASHCS1 (FCS1) signal, as shown in Table 2. ASIC110 receives signal DO-15 from the data bus 106, and outputs them to the CPU-data input buffer 182. The buffer 182 outputs data to the B data output buffer & latch circuitry 184, and the circuit 184 outputs output signal BD0-15. The buffer 182 outputs data to the power-controls logic circuit 186, and the control logic circuit 186 outputs SLEEP (sleeve) and a PWRDWN signal.

[0027]The signal BD0-15 can output data to the B data input buffer 188, and the buffer 188 outputs the data to the CPU-data output buffer 190. The interrupt control logic circuit 170 outputs a signal to the buffer 190. the composition register 192 -- a composition signal (the capacity of hardware constitutions, for example, a flash memory, or DRAM.) Or a CPU-data output buffer can be supplied and the output buffer can supply the data on the bus 106 to the CPU, the both, a monitor power supply, or a plug-in card, for example, a network card. Next, reference of drawing 4 should understand still better the main elements of the terminal operating system of this invention. It should be understood from the aforementioned thing that the hardware of this invention is incompatible with a standard AT bus design. Instead, it depends for this invention on the firmware which provides BIOS service required for the software layer of a higher rank. Firmware is designed in a certain example operate in a virtual 8086 mode to AT compatible hardwares, such as an interrupt controller and a timer emulated by software as minutely as possible. The standard keyboard controller is used in the example, however a non-standard controller is used by the case as an interface to the device by which an emulation is carried out. The input output signal from the port of such hardware components is intercepted so that the emulation may be made easy. The memory management function of a processor can be enabled it to simulate the wrap around generated at 1 MB in the usual hardware under control of A20 gate emulated.

[0028]If reference of drawing 4 is continued, a terminal operating system will start execution by the boot block 300, next loading of the kernel 305 will be carried out. The kernel 305 provides many intercepting and remapping functions of this invention so that it may explain to below specially. The IO.SYS code 310 is loaded by completion of the kernel 305. Next, the command which the COMMAND.COM code 315 was loaded, next

was provided by the AUTOEXEC.BAT file is executed. Although the AUTOEXEC.BAT file is not used not only in a VGA XMS driver but in all examples, it contains the keyboard & mouse driver, for example. The file may contain other arbitrary codes containing the code which starts the self-test sequence performed when relevant conditions exist. In a certain example, the loopback plug provided in the communication port performs the self-test sequence.

[0029]The EXEC.COM code 325 is loaded to the next. At this time, that system goes into setting-out mode according to a mounted state, or a user command causes the ingress to that setting-out mode, or causes loading of a NETO work connecting cord. In this example, a system goes into setting-out mode, gains the present constitution data, and then performs loading of a network connection code. When the operation state allows a user selection and the setting-out mode is selected by the user, EXEC.COM325 branches and performs SETUP or GUI330. When setting-out mode is not selected, EXEC.COM325 starts execution of a network connection code (again ICA, a small-gage wire, com, or other networks) in cooperation with loading and unloading of a network driver by 335 340. a book -- in a suitable example, the network connection code can input the standard version of the WinFrame from Citrix Systems including substantial change-bar JON of WinFrame for DOS users.

[0030]Next, reference of drawing 5 should understand still better the terminal operating system of this invention, and the situation of cooperation of the hardware architecture. Especially the bottoms of the heap shown in drawing 5 are an input/output system and the hardware layer 400. The upper layer is the BARAIBA layer 402.

The top layer is the application layer 404.

At the time of a power turn, the initial test 406 of power turn & in a hardware layer is performed as a part of PUTO block 300. The initial test 406 of power turn & is selectively performed [ 116 / RAM] from the flash memory system 112. If a power turn self-test is completed, although a terminal performs the boot sequence generally mentioned above in relation to drawing 4, The boot sequence includes the COMMAND.COM sequence shown by the remainder of the boot block 300, and the AUTOEXEC sequences 408 and 315. Both the AUTOEXEC and COMMAND.COM file are saved at the flash memory.

[0031]An AUTOEXEC file is loaded after execution of the COMMAND.COM sequence of a terminal. The AUTOEXEC makes EXEC.COM325 load instead. As mentioned above, the EXEC.COM sequence 325 can branch to either the setting-out module 330 or the network connection module 340. When the operation parameters of the time of installation and a terminal need an inspection or changing, the setting-out module 330 is performed always. The setting-out module 330 receives information from the one or more setting-out data files 418, and starts the GUI engine 420. The GUI engine 420 communicates with the keyboard driver 422 of a terminal operating system, the mouse driver 424, and the file & memory service driver 426. The GUI engine 420 communicates with the image input/output system 428, and the system 428 supplies data to the image controller 430 based on Cirrus5429 graphic processor, for example, and it generates graphic display in a setting-out sequence. The setting-out sequence is explained in full detail below in relation to drawing 5.

[0032]Although the keyboard driver 422 communicates with the keyboard & mouth controller hardware 432, the hardware 432 is a conventional PS/2 keyboard input/output

system and general-purpose serial bus (USB) interface, for example.

It is [ in / at least / the example of several affairs ] aforementioned United States patent 4,706,068th. A keyboard interface of the 4-wire system which is explained is also included.

Similarly, the mouse driver 424 is usually communicating only the mouse input/output system 434 and the suitable number of times. The flash plate file & memory service portion 426 of a terminal operating system is usually performed from a flash memory and RAM during such operation. In relation to drawing 5, as explained in full detail, the user can specify the configuration information on the terminal containing the parameter of a network interface or the details of composition of being related, a language, a color, other parameters, etc. according to a setting process. Specification of these parameters will save the data at the connection data file 440.

[0033]At this time, the user can come out of the terminal setup module 414, and returns to EXEC.COM. If continuing is possible, the EXEC.COM process 412 will be branched by the network connection module 416. The network connection module 340 is reading the data saved at the line of code of the connection data file 440 and its connection module, and it starts, therefore it communicates the method of having a dialog for the driver of the terminal, or the remainder of a hardware layer to an application server. Especially the network connection module communicates with the keyboard driver 422 of a terminal operating system, the mouse driver 424, the image input/output system 428, and the file & service portion 426. A network connection module is connected not only with the hardware network interface 444 in the example of several affairs but with the hardware serial interface 442. In a certain example, although the network driver 444 is performed from RAM 116, it may be performed from the flash memory 112. Although RS232 conventional interface may be sufficient as the serial interface 442, the serial connection of other forms, such as a general-purpose serial bus (USB), may be sufficient as it.

[0034]Next, if drawing 6 is referred to, operation of the GUI engine 420 shown in drawing 5 under execution of the setting-out module of the terminal 12 should be able to recognize still better. Between setting-out modes operates and a GUI engine provides a fundamental graphic user interface during composition operation. As it mentioned above in relation to drawing 5, when a setting-out sequence is called during a terminal boot rise, operation of drawing 6 begins. The setting-out sequence is a sequence of a keystroke, or other suitable means, and is called. Starting a setting-out sequence by calling the setting-out code 502, the setting-out code 502 pulls out information from the setting-out data file 418. The setting-out data file 418 clarifies an usable selection object with the composition of the terminal. The RAM structure 504 communicates in both directions, and the setting-out code 502 makes the present initial entry of the connection data file 440 write in the RAM structure 504. The GUI engine 420 communicates with the RAM structure in both directions, is the arrangement described below as a field, a group, and a selection object, and sets up and displays the present information. The hardware interface 506 provides the image controller 430 with video information, and, on the other hand, answers the information received from the user by the mouse 260 and keyboard 250 course.

[0035]The user can circulate through two or more composition menus for [, such as a language displayed on the terminal, and the network connection method, ] the operating characteristics of the terminal in setting-out code. Drawing 7 is a schematic illustration of

the setting screen used by the configuration mode of a terminal. In a certain suitable example, the installation drawing is displayed diagrammatically. When a user circulates through those lineblock diagram sides, constitution data may be selectively updated, when a user uses a keyboard and a mouse. Before the updated data is written in a connection data file, it is saved in the RAM structure 504. however, a book -- in a suitable example, a certain thing in the data is updated dynamically, and on the other hand, the remaining data is not updated until a setting-out sequence is completed. The setting-out sequence returns to EXEC.COM325 for initialization of the network connection module 340 shown in drawing 5 at the time of the end of the setting-out sequence including writing arbitrary residual constitution data in the connection data file 436.

[0036]Reference \*\*\*\*\* of drawing 7 and the integrated window where data appears are referred to as the field 600. There are the one or more groups 610 in the inside of each field 600, and each group 610 comprises the one or more selection objects 620. That is, for the "Communication (communication)" group, each selection object is connected with the field 630 which shows that the selection object was chosen in the example of drawing 7 including the selection object Serial Port (serial port), TCP/IP, SPX, and IPX. Next, reference of drawing 8-drawing 10 shows the data structure related to the composition software. In particular, AREALIST700 has a list of field pointers. The structure shown with the field list contains the boundary, the size, title, and group who are added to all the fields defined by a setting process. As mentioned above, each field looks like the window on a screen. All the fields displayed now are indicated to DISPAREALIST702. In a certain example, the first field indicated is displayed on the bottom of a drawing, and the field of the last indicated is displayed on the topmost part of a screen. In the example, although partial overlapping is not a reason required in all the examples, partial overlapping is also allowed.

[0037]There is a data structure for GROUPLIST in 704, and the structure has indicated all the groups defined by the setting process in all the fields in AREALIST700. As mentioned above, in each field, one or more groups are usually contained. To one STRINGLIST, the arbitrary data structures 706 are prepared and FILELIST708 is further prepared as a directory to the bitmapped image used in the state of a multiplex instance within the limits of various fields, a group, and a selection object. The structure of AREALIST700 can be seen by 710 including the block field ID712, the pointer 714 to the next field, the pointer 716 to a former field, and for structure pointer 718. The structure pointer 718 related to each field ID712 has pointed out the field structure 715 containing field ID712 with the ABSX entry 720 and the ABSY entry 722, in order to give the position of the field (setting in a certain example) of the upper left corner of the display. The field structure 714 includes the ROWS entry 724 and the COLUMNS entry 726 which specify the area size together. The FLAGS entry 728 specifies whether a certain boundary is extended to the circumference of the field. The TITLEPOSITION entry 730 and the TITLEBAR entry 732 specify the character string within the limits of the title bar of a specific region and position of a title, and, on the other hand, the MAXSTRLEN entry 734 specifies the maximum number of letters used for the title.

[0038]The entry 736 of the group number which is within the limits of the specific region also has the field structure 714. The AREAMPTR entry 738 specifies the hot spot of the mouse pointer in the field, and, on the other hand, the DEFBUTTON entry 740 specifies

which button in the field is a default. Although a Cancel button is specified, the CANBUTTON entry 742 is started when the button and the "esc" key are pressed. One pointer list is specified as 744A-744N by each group related to the field at the last. Each group pointer 744 shows the following affiliate group structure blocks 746. A hot key list is defined for [ the ] fields. The structure of DISPAREALIST shown in 748 is intrinsically the same as the structure of AREALIST700, and contains field ID, the next field, the former field, and the structure pointer. With ARERLIST700, DISPAREALIST748 shows the field structure 714. The same structure of GROUPLIST704 is shown by 750 and contains the group ID 752, the following group pointer 754, the former group pointer 756, and the group structure pointer 758. The same structure of arbitrary STRINGLIST706 is prepared and contains string ID760, the following string pointer 762, the former string pointer 764, and the string structure pointer 766.

[0039] When the group structure pointer 758 is referred to, again it, In order to clarify the selection object which shows the group structure blocks 746, and will carry out the BOPPU rise of this group automatically if started, The group ID 752, The PARENTSELECTID entry 780, The GSTARTX entry 784 and the GSTARTY entry 786 for specifying the relative position of the HOTSPOTCOUNT entry 782 for clarifying the number of hot spots of the mouse in the group and the group in the field are included. In a certain example,; relatively specified to the upper left corner of the field where both selected positions contain them with a group, however other relations are defined as permitting specifying the position of a selection object relatively to the group's position. The most important element is that all the functions of the field maintain those positions certainly, when a certain field moves.

[0040] The group structure blocks 746 include the ROWS entry 788 and the COLUMNS entry 790 for specifying the group's size with the GFLAGS entry 792 for specifying the group's boundary. The QUICKKEYPOSITION entry 794 and the QUICKKEYSTROKES entry 796 may be specified to the combination of the "hot" keystroke related to the group. The entry 798 for title positions, the group label 800, and MAXSTRLEN802 are provided like field structure. It is provided in order that the NUMOFSELECTS entry 804 may clarify the number of the selection objects contained in a group. Next, the AIDATTACH entry 806 is formed as a back reference of field ID712 to which the specific group relates. In all cases, the AIDATTACH entry 806 is not required, but it is assistance at the time of improving performance in the example of at least several affairs. Finally, 808N shows the structure of the selection object relevant to a specific group from the pointer entry 808A which became a table, respectively. Although the structure of various selection objects is related to each group so that it may explain below, a certain element is common in the various forms. That is, the first pointer 808A shows the SELECTCOMMON structure blocks 810. If the field structure blocks 714 are referred to again, the default button entry 740 and the Cancel button entry 742 also show the SELECTCOMMON structure blocks 810. The SELECTCOMMON structure blocks 810, In order to specify the selection object ID entry 812, the entry 814 which gives the back reference to the group ID, and the position and size of a selection object, With ROWS and the COLS entries 820 and 822. QUICKKEYPOS for specifying the combination of the hot keystroke relevant to a certain RELX and the RELY entries 816 and 818, and the selection object of those and the QUICKKEYCHR entries 824 and 826,

and the greatest size and title of the selection object. The SFLAGS entry 832 for specifying MAXSTRLEN828 and SELECTSTR830 for specifying, and the characteristic of the selection object is included.

[0041]The SELECTTYPE entry 834 is also formed. As mentioned above, are usable and refer to drawing 7 for the selection object of various forms again. The selection object of various forms established in a certain group is dependent on a data format required of the step for constituting the terminal. In a certain example, only by pushing a button (refer to 650 of drawing 7), as shown by "communication" and the "serial port" groups 660 and 670 of drawing 7 in the case where it is; etc. to which a selection object is called, one is chosen from two or more selection objects, and if \*\*\*\* is also \*\*, there is nothing. When another, a certain picture is chosen, and on the other hand, when it is others, a specific character string must be chosen. In a certain case, a write-in entry is required (680 of drawing 7), and, on the other hand, in other cases, it must write in one in many items. Although these are the forms of the selection object mounted in a certain example, the list is not comprehensive, and other selection objects may be simply carried out, if it explains here.

[0042]About the "write-in" selection object, in order to clarify from which character on the string it should be displayed, a cursor start and the end entries 836 and 838 of cursor are formed with the entry 840 "displayed first." The LABELRELX entry 842 is formed with the LABELRELY entry 844 and the LABELSTR entry 846. To the selection object of "one from much inside" mold, the NUMOFSELROWS entry 848 and the NUMSELCOLS entry 850 are formed. It is provided in order that the number entry 852 for option and the entry 854 for default option may clarify the number for [ which is an active state ] option with the high-speed key pointer 856 and the flag pointer 858. Finally, the size 860 of the selection object is also formed.

[0043]To the selection object of a "picture" mold, only the file ID entry 708 and the picture pointer entry 862 must be specified. To the selection object of an "item" mold, the "child group" ID entry 864 is formed with the child group pointer which points out the form of the group structure shown in the group structure blocks 746. the child group pops up automatically, when the parents are started -- a group -- one of items is chosen. As opposed to the selection object of "string list" form, As for the entry, the maximum length (or MAXOPLN) 870, the level display offset entry 872, and the vertical display offset entry 874 of several 868 for option and the title for [ the ] option are provided with the X label position 878 and the Y label position 880. Finally, the size entry 884 of the label string 882 and a selection object string is formed.

[0044]If the AREAMPTR entry 738 is referred to again, a mouse pointer hot spot will be specified by the structure containing the field ID entry 900, the group ID entry 902, and selection object ID904. The form 906 for option is established in order to specify the form of a selection object that a specific hot spot is related. The back reference entries 908 and 910 are formed in the group ID in the field, and selection object ID in the group. Four entry 912A-912D specifies the position of X and Y of the upper left part of the hot spot of the mouse, and the position of X and Y of a lower right part with the mouse flag entry 914 of a mouse which hot spot starting is made to be carried out, when a suitable menu is displayed. In addition to the aforementioned hot spot, the additional hot spot is established in the title bar position so that the field window can be moved to the upper and lower sides of a list display again for scrolling.

[0045]It is prepared in order to maintain the entry as which the data structure is also chosen from many selection objects now in addition to the aforementioned structure. The present data structure block is shown in 950. The number entry 954 of area number entry 952; definition files defined by SETUP now; the entry 960 for assigning the entry 956 of the group number and the number of selection objects which are defined, 958; and the predetermined number of the maximum selection objects is included. The number of the maximum selection objects is assigned to 10 blocks in a certain example. The additional entries 962 and 964 are formed in the pixel numbers of a sequence and an end of a road, respectively with the font entry 966, the field focus entry 968, the group focus entry 970, and the string focus entry 972. The mouse focus entry 974 is formed in order to specify a hot spot. It may be provided in order that OFOCUS and the TFOCUS entries 976 and 978 may specify the option matter and the form of a selection object of having a key boat focus. IFOCUS and the JFOCUS entries 980 and 982 may be formed in above hot spot entry 908 and object for 910 from mouse structure blocks. Finally, the menu entry 986 is specified in order to clarify [ entry / for specifying a mouse mode / OFLAGS ] the present menu focus with the entries 988 and 990 for defining the boundary of a field, and a group's boundary again.

[0046]The information which specifies the actual condition of a selection object is specified with the ACTIVE SELECT (selection object of active state) structure 1000. As for each structure, the ACTIVE entry saves the actual condition of all the selection objects that the data is made usable to the SETUP code, including the button entry 1002, STFLAGS or the common flag selection entry 1004, and an ACTIVE entry. In a certain example, in order to record a keyboard, a stroke, and mouse operation on a certain phenomenon queuing, the phenomenon queuing structure 1010 is also established. As mentioned above, the main features of this invention are that it is incompatible with standard PC/AT BIOS or DOS to the terminal operating system of this invention. However, the terminal operating system, In order to maintain the capability to display application data on the emulation of a Citrix user or others currently supported in multiuser environments by interfacing etc., it is necessary to support these functions certainly. Table 3A-Being attached as 3C, it is \*\*\*\* clear to a person skilled in the art that; book list which is a list of standard IO.SYS and BIOS.SYS functions currently supported by this invention does not include many standard BIOS and DOS functions. A function except this is not supported. A certain thing of the functions indicated is not selectively supported in the present suitable example. That is, the function of 36h Since the flash memory is used instead of a hard disk, [Get Disk Free Space] is not supported selectively. Similarly, it is a function of 33h. Although [Get/Set SystemValue] is supported about the function and the flag, the "Control-Break" function is not supported. Similarly, it is to 2D[ from function 2Ah ] h. Since real-time hardware is not provided in the terminal of this invention, the [Get/Set Date/Time function] is not supported selectively. Since it is used without being reflected in absolute time in order to measure the duration time of a phenomenon, the "Get Time" function is supported.

[0047]The flash plate file system of this invention is divided into many single directory devices in the present suitable arrangement. However, unlike the conventional disk file, the flash plate file system includes neither the cluster nor the section. The file in each device or a division is extended from the bottom of the division to the upper part, and, on the other hand, a directory entry is caudad extended from the topmost part. A file is saved

continuously, without being subdivided. In a certain example,; to which the directory entry which is 16-byte length resembles the DOS directory generally, however the element saved are usually defined as performing the file from a flash memory rather than DRAM. These include the start address of the file in the flash memory with the remapping classification of the file in the DOS address space.

[0048]Although deletion of a file resembles deletion of the conventional DOS file, it differs at a certain important point. In this invention, when a certain file is \*\*\*\*\* (ed), the 1st byte of the directory entry is changed into 0 rather than is set as E5h. This step is carried out without eliminating a flash plate block. A following file is written in the next usable place. However, when there is not sufficient availability for a following file, the flash plate block for the deletion file is eliminated, and a restoration file is re-written in the flash plate block with which the deletion file was maintained. As mentioned above, subdivision of a file is not allowed at least in a certain example. "DEBUGMSG" new in order for a flash plate file system to support conventional DIR, TYPE, and a DEL command and to create a DEBUG message A command is supported and execution of a program is also further supported from the batch file. The file system is also supporting the AUTOEXEC.BAT file with EXE, a COM file and interruption [ 21h and 27h ] loading, and execution. However, in a certain example, the file system is not supporting the CONFIG.SYS file or the SYS device driver at least. Similarly this file system A batch file command (except for execution of a program), Redirection of input and output, pipe processing, or 20 h of interruption [Program Terminate], 22 h [Terminate Address] and 23 h [Ctrl-BreakExit Address], 24 h [Critical Error Handler Vector] and 25 h [Absolute DiskRead] and 26 h [Absolute Disk Write] and 2Fh [Multiplex Interrupt] is not supported. [0049]said more selected group -- although standard BIOS and a DOS function are emulated by the terminal operating system of this invention, and supported, probably, it will be clear [ considerable standard BIOS and DOS function ] of a number not to be supported. Such BIOS and the DOS function which are supported are not necessarily performed by standard AT compatible hardware. Instead, the portion of the terminal operating system referred to by drawing 4 has established the capability to emulate these functions, as "boot block" 300 or "kernel" 305. The service function currently supported by the boot block 305 about :drive size. GET FLASH DRIVE SIZE asked to the flash memory 438 ; In order to read data from the flash memory 438, READ FLASH DRIVE; WRITEFLASH DRIVE ; In order to ask the block length of the flash memory 438, GETFLASH DRIVE BLOCK SIZE; ERASH FLASH DRIVE BLOCK for eliminating data from the flash memory 438 ; In order to circulate repetition power turn diagnosis, WARM REBOOT which is used by a production test and is not usually used at the time of operation ; GET BOOT BLOCKDATE ; Are used to the control element to which the keyboard controller was connected. CLEAR KEYBOARD CONTROLLER I/O BIT ; It reaches. SET KEYBOARD CONTROLLER I/O BIT is included.

[0050]Operation of the kernel 305 is explained in more detail. Especially the kernel has three service functions. The 1st function is a "ATIVATE VIDEO INT 10h" function. It enables operation of the usual interruption "int 10h" function to video service. While [ it ] interrupting and loading various device drivers, "int 10h" is intercepted by the kernel 305 in the beginning so that the message of the text mode from those drivers may not be displayed. After loading a driver and becoming terminal graphics mode, a "ACTIVATE VIDEO INT 10h" function is called, and usual "int 10h" operation is



revitalized. The kernel 305 can set up a delay timer for the function to start various power saving functions (Energy Star conformity etc.) and the function of those including the 2nd function and "SET POWER DOWN TIME." Finally the kernel 305 is the DOS environment including the "PROCESS DOS INTERRUPTS" function, When it is necessary to process suspension DOS interruption which needs a real-time operation, the function can be called from other portions of a boot block or the kernel 305 at any time. Interruption frequently processed with this function is mouse & keyboard interruption. This interruption includes timer, serial, parallel, and network each interruption.

--- The interception by this function has got mouse & keyboard interruption blocked in the degree very much for a long time, for example, When it is necessary to be so long that it be provoking for a user, for example, for the delay between a motion of a mouse and the responding operation of cursor to send a command to --- during about 1 second, and a keyboard controller, In order to carry out a keyboard controller output, it prevents using time to pass enough and impossible of operation.

[0051]The hardware of this invention is not based on a PC/AT standard, but firmware, Although not based on conventional PC/AT BIOS or DOS, an overall system, Since it has intention so that a user may look at the conventional Windows display and can have a dialog further, the call relevant to a certain amount of conventional hardware interrupt must be managed by this invention. In a certain suitable example, such interruption and a call are dealt with with the firmware of a terminal by emulating suitable correspondence to the input signal, or changing. In relation to the following software kernel, the correspondence is still more detailed and is dealt with. A kernel puts a processor on a virtual 8086 mode, and sets up various tables required in order to intercept the input and output to further various ports. In order to emulate PC compatibility correctly, the command which generated the exception by access to the selected port after the exception occurred is disassembled so that it can be processed. Since a certain whole subroutine is performed to the each intercepted input/output instruction, the input and output which were not performed if the input/output instruction was high-speed, therefore were intercepted are restricted to the fewest possible ports. In a certain example, since a certain whole input/output port or a portion is required for preservation of compatibility with AT, it is interrupted. Although the first example described here is because the personality of Citrix WinFrame is provided, it can be mounted by other personalities for use by the terminal of this invention. In a certain example, the terminal of this invention may have two or more personalities in the memory with the terminal connected to the multiplex host who is operating a different operating system which expects such a different personality. Through a hot key or other sequences, it can choose from the personalities, the kernel of this invention performs a suitable personality from a memory, and the user or other users enable communication to a still more suitable host.

[0052]Input/output port intercepted by the kernel in order to maintain compatibility with AT: 20h [The command port of AT compatible interrupt controller] Only a --- "end of interrupt" command is emulated, and the command has a the same priority, or in order to generate lower interruption, it is published at the time of the end of each interrupt handler. The kernel is equivalent or emulates the normal operation of PC compatible interrupt controller which blocks interruption of a lower priority until the "end of interrupt" command is received.

21h[The mask register of AT compatible interrupt controller] --- emulation of is done.

40h-43h[Access to AT compatible 8254 system timer] Since AT base driver of the kind --  
- Existing writes in these ports, a port is intercepted although not emulated. Since the  
interruption mask register of the example of this invention is set as the port 40h, non-  
intercepting writing blocks the interruption mask register of this invention.

[0053]61h[Control ports of others on AT architecture] A --- 1 loudspeaker control bit is  
emulated so that the loudspeaker can be turned on and off.

A0h[The command port of the 2nd interrupt controller of AT compatible computer] The  
"end of interrupt" command is emulated like the --- port 20h.

A1h[The mask register for the 2nd interrupt controller (similar to the port 21h)] ---  
emulation of is done.

2F8h-2FFh[The standard address for the 2nd serial port of AT] 5F0h-5FEh is  
RIMAPPINGU a --- port, and the address is a port address for the 2nd serial port of the  
example of this invention. New port range [5F0h-5FEh] includes only the even address.  
In a certain example, byte swapping is not mounted, therefore it is accessible only to even  
bytes of an 8-bit SIO device in it. However, byte swapping may be mounted if required.

[0054]378h-37Fh[The standard address for AT parallel ports] --- 6F0h-6FEh is  
RIMAPPINGU, and the address is a port address for parallel ports of the example of this  
invention.

3F8h-3FFh[The standard address for the 1st serial port of AT] --- 7F0h-7FEh is  
RIMAPPINGU, and the address is a port address for the 1st serial port of an example.

Although the suitable example and alternative of this invention were fully explained, that  
many alternatives and equivalent things exist within the limits of this invention should be  
able to understand explanation here to the person skilled in the art. Therefore, this  
invention is not restricted to the above-mentioned explanation, but is merely restricted  
only to an attached claim.

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[Translation done.]

## **\* NOTICES \***

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

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## **CLAIMS**

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[Claim(s)]

[Claim 1]A terminal characterized by comprising the following for displaying application program information in windowing environment.

A processing means by which adaptation was carried out so that window information supplied from a program which is operating on an application server which does not have compatibility in BIOS or a disc operating system, and completeness of a personal computer, and is in a distant place might be received.

A displaying means for displaying this window information.

[Claim 2]A terminal by which adaptation was carried out in order to communicate with one set of a system characterized by comprising the following chosen from a host system which is using a protocol with which it is two or more host systems, and the each differs.

The 1st personality for supplying a response to the 1st set and 2nd-set command supplied from this 1st host system according to a communications protocol relevant to the 1st host system.

He is the 2nd personality at least for supplying a response to the 3rd set and 4th-set command supplied from this 2nd host system according to a communications protocol relevant to the 2nd host system.

At least one in said host system for supplying window information.

In order to supply a response to this communications protocol relevant to a host system, and a this compatible related host system, this -- in order to process the 1st and 1 set in the 3rd command -- this -- in order to emulate 1 set in the 2nd and the 4th-set command -- this -- with the 1st and a processor means to answer this 2nd personality at least. in order to communicate with a host system this identified in order to identify this host system to which this terminal is connected now -- this -- a means for switching for choosing one suitable personality in this 2nd personality at least with the 1st.

[Claim 3]A method characterized by comprising the following for updating the operating characteristic of a terminal.

A step which provides a flash memory since an operating characteristic is saved.

A step which supplies a communication link to a host in order to receive an updated operating characteristic.

A step to which at least a predetermined portion of this flash memory establishes the 1st operating state that may be written in while maintaining communication with this host.

A step which downloads an operating characteristic updated by this terminal from this host while this terminal is in this 1st operating state, A step at which this terminal writes a this updated operating characteristic in this flash memory while being in this 1st operating state, and a step which establishes the 2nd state where data is not written in a portion of this flash memory

predetermined [ this ].

[Claim 4]Microsoft Windows comprising: Operating environment (registered trademark)

Microsoft Windows In a terminal for displaying application program information supplied by a host system which is operating an operating system (registered trademark), An interfacing means for receiving display information for application programs that it is operating on this application server from this application server.

There is no compatibility in BIOS or a disc operating system, and completeness of a personal computer, In order to supply this host system, them which cannot execute this application program locally but are expected by this host system, and a compatible response, A processing means to answer this interfacing means in order to emulate a command supplied from a program which is operating on an application server at a distant place or to process.

A displaying means which answers this processing means in order to display this window information.

[Claim 5]A method for constituting a terminal which has a display in order to communicate with a host system characterized by comprising the following.

A step which establishes at least one bit map area on these some displays.

A step which establishes at least one bit map group in this field.

A step, wherein it establishes at least one bit map selection object in this group and each selection object has one or more selection items relevant to it.

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[Translation done.]

## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is arrangement with the application server and the accepted terminal in connection with this invention.

[Drawing 2] A functional block diagram expresses the logic architecture of this invention.

[Drawing 3] A block diagram expresses the architecture of control ASIC of drawing 2.

[Drawing 4] It is a schematic diagram of the software architecture of the terminal in connection with this invention.

[Drawing 5] The block diagram which simplified the setting-out interface between the GUI engine of the system and other things expresses.

[Drawing 6] The terminal of this invention expresses with a flow chart the situation of the record level of the process connected to an application server.

[Drawing 7] The setting screen from the composition software of this invention is expressed.

[Drawing 8] The data structure relevant to the composition software of this invention is expressed.

[Drawing 9] The data structure relevant to the composition software of this invention is expressed.

[Drawing 10] The data structure relevant to the composition software of this invention is expressed.

[Description of Notations]

100 CPU

102 Clock & reset logic circuit

110 ASIC

112 Flash memory array

114 VGA controller

118 Other logic circuits

124 Serial I/O & parallel controller

126 Keyboard & mouse controller

128 LAN controller

144 DRAM

146 CRT

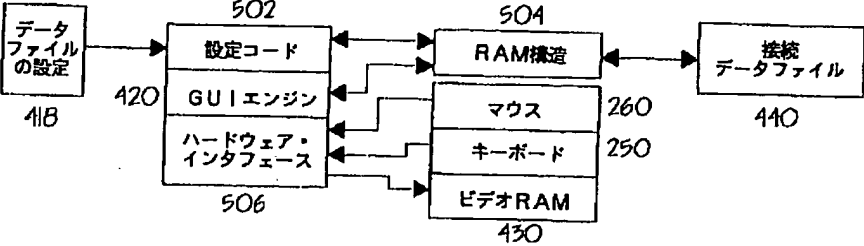
148 MPS

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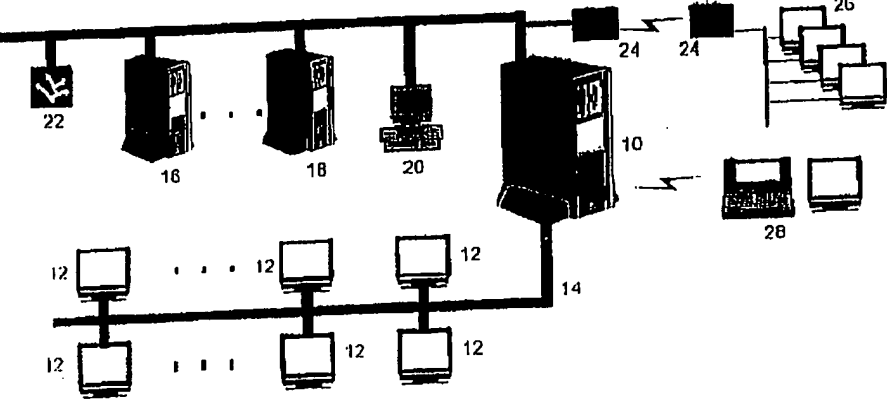
[Translation done.]

DRAWINGS

[Drawing 6]

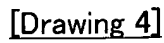


[Drawing 1]

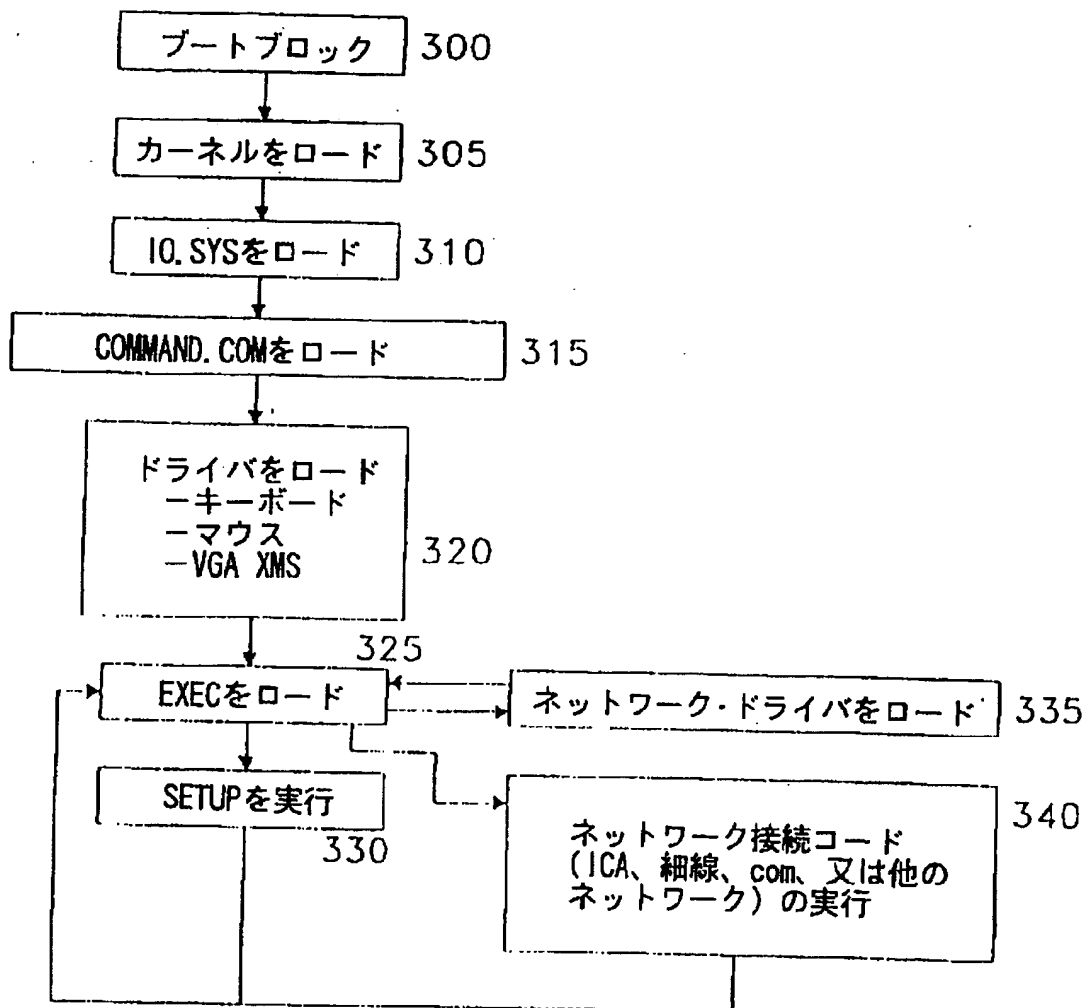


[Drawing 3]









[Drawing 7]

**接続特性**

種別:

ユーザ名:

領域:

パスワード:

コマンド行:

作業ディレクトリ:

☒ 音響使用可

**通信**

- ☒ シリアル・ポート
- ☐ TCP/IP
- ☐ IPX
- ☐ SPX

**シリアル・ポート**

- ☒ Com1 直接
- ☐ Com2 直接
- ☐ Com1 w/ モデム付
- ☐ Com2 w/ モデム付

**設定**

シリアル・ポート: Com1-Direct

伝送速度: 115200

ハードウェア: Hardware

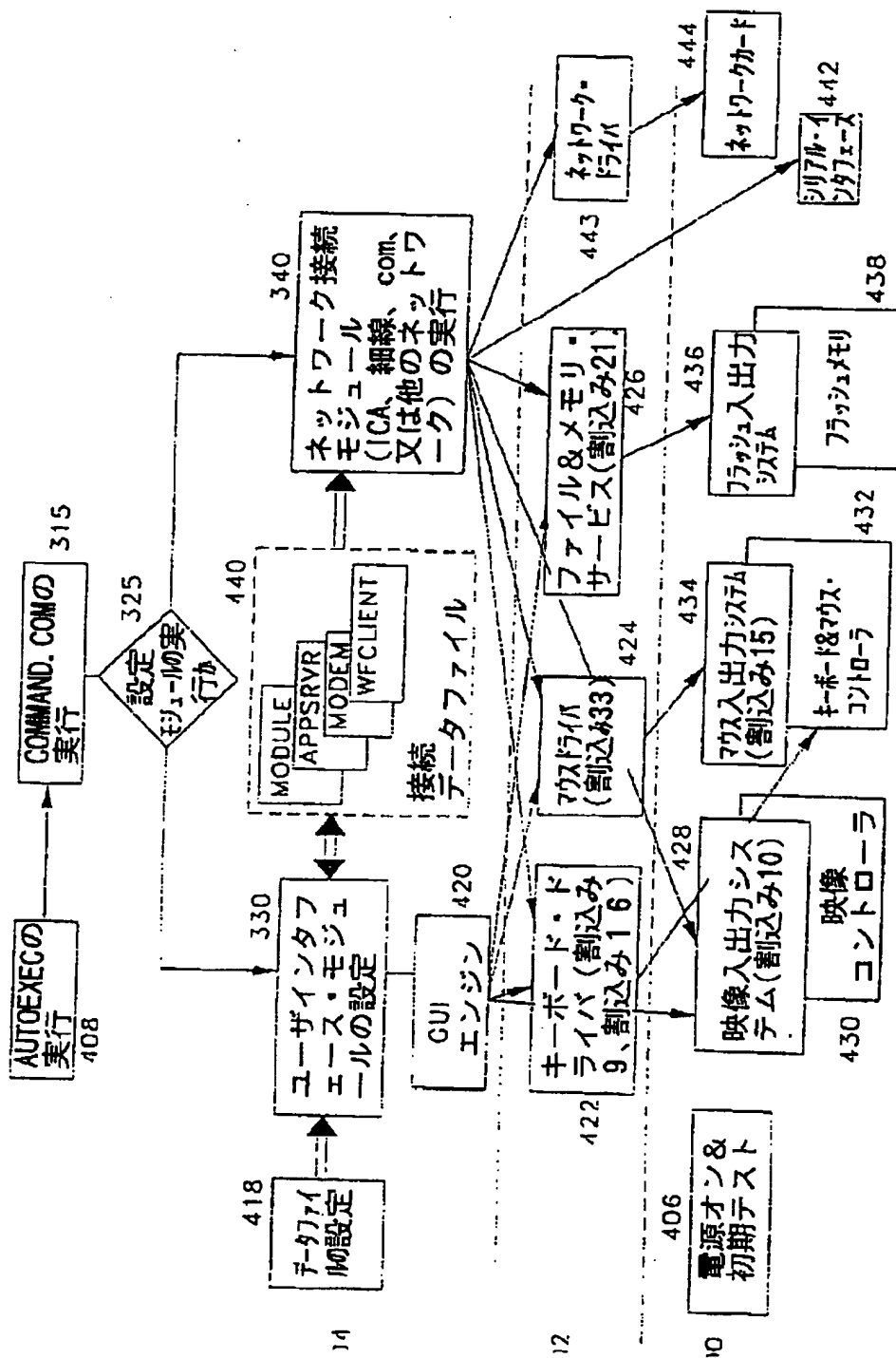
モデム: None

電話: None

Buttons: OK, Cancel, Settings

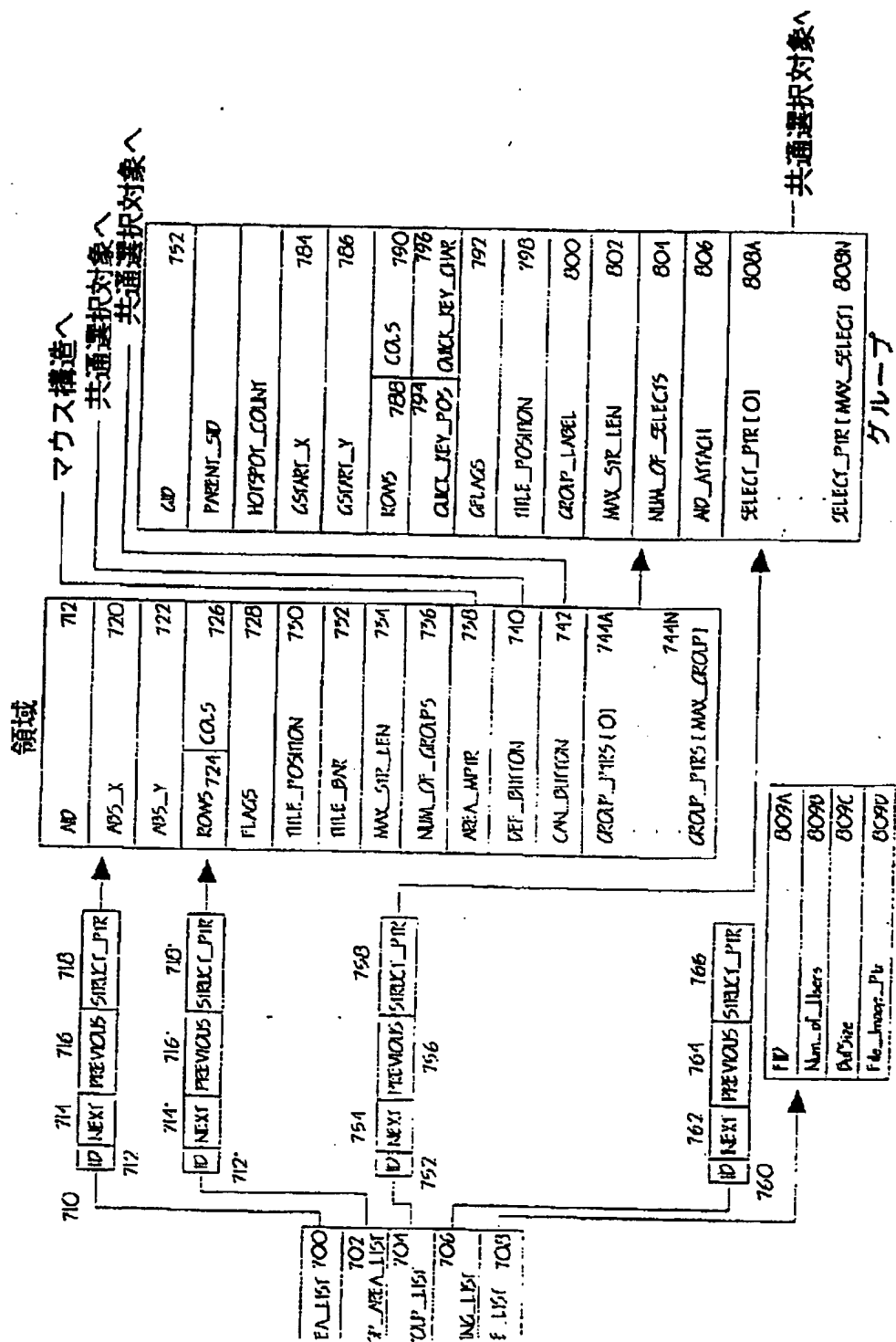
Handwritten annotations: 600, 630, 640, 650, 660, 670, 610, 620, 610

[Drawing 5]



[Drawing 8]

[Drawing 9]



[Drawing 10]

共通選択対象

Select_ID	032
CD	034
Rd_Y	036
Rd_Y	038
ROWS	030
CDL	035
CDL	037
CDL	039
CDL	041
CDL	043
CDL	045
CDL	047
CDL	049
CDL	051
CDL	053
CDL	055
CDL	057
CDL	059
CDL	061
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マウス構造

Press_ID	900
Group_ID	902
Select_ID	904
Option	906
Select_Type	908
DL of Group	910
Upper_L_X	912
Upper_L_Y	914
Lower_R_X	916
Lower_R_Y	918
WLAGS	920

選択対象一記入 選択対象一多数からの選択 選択対象一画像 選択対象一項目 選択対象一一覧表

Cursor_Start	036	Cursor_End	038	Num_of_Sel_Knws	040	Num_of_Sel_Knws	042	Num_of_Sel_Knws	044	Num_of_Sel_Knws	046	Num_of_Sel_Knws	048	Num_of_Sel_Knws	050	Num_of_Sel_Knws	052	Num_of_Sel_Knws	054	Num_of_Sel_Knws	056	Num_of_Sel_Knws	058	Num_of_Sel_Knws	060	Num_of_Sel_Knws	062	Num_of_Sel_Knws	064	Num_of_Sel_Knws	066	Num_of_Sel_Knws	068	Num_of_Sel_Knws	070	Num_of_Sel_Knws	072	Num_of_Sel_Knws	074	Num_of_Sel_Knws	076	Num_of_Sel_Knws	078	Num_of_Sel_Knws	080	Num_of_Sel_Knws	082	Num_of_Sel_Knws	084	Num_of_Sel_Knws	086	Num_of_Sel_Knws	088	Num_of_Sel_Knws	090	Num_of_Sel_Knws	092	Num_of_Sel_Knws	094	Num_of_Sel_Knws	096	Num_of_Sel_Knws	098	Num_of_Sel_Knws	100	Num_of_Sel_Knws	102	Num_of_Sel_Knws	104	Num_of_Sel_Knws	106	Num_of_Sel_Knws	108	Num_of_Sel_Knws	110	Num_of_Sel_Knws	112	Num_of_Sel_Knws	114	Num_of_Sel_Knws	116	Num_of_Sel_Knws	118	Num_of_Sel_Knws	120	Num_of_Sel_Knws	122	Num_of_Sel_Knws	124	Num_of_Sel_Knws	126	Num_of_Sel_Knws	128	Num_of_Sel_Knws	130	Num_of_Sel_Knws	132	Num_of_Sel_Knws	134	Num_of_Sel_Knws	136	Num_of_Sel_Knws	138	Num_of_Sel_Knws	140	Num_of_Sel_Knws	142	Num_of_Sel_Knws	144	Num_of_Sel_Knws	146	Num_of_Sel_Knws	148	Num_of_Sel_Knws	150	Num_of_Sel_Knws	152	Num_of_Sel_Knws	154	Num_of_Sel_Knws	156	Num_of_Sel_Knws	158	Num_of_Sel_Knws	160	Num_of_Sel_Knws	162	Num_of_Sel_Knws	164	Num_of_Sel_Knws	166	Num_of_Sel_Knws	168	Num_of_Sel_Knws	170	Num_of_Sel_Knws	172	Num_of_Sel_Knws	174	Num_of_Sel_Knws	176	Num_of_Sel_Knws	178	Num_of_Sel_Knws	180	Num_of_Sel_Knws	182	Num_of_Sel_Knws	184	Num_of_Sel_Knws	186	Num_of_Sel_Knws	188	Num_of_Sel_Knws	190	Num_of_Sel_Knws	192	Num_of_Sel_Knws	194	Num_of_Sel_Knws	196
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現在

Total_Area	952
Total_Plc	954
Total_Group	956
Total_Sel	958
Max_Sel_Entry	960
Pixels_per_Col	962
Pixels_per_Row	964
Font	966
AreaFocus	968
GroupFocus	970
SelectFocus	972
MouseFocus	974
Ofocus 976	Ifocus 978
Ifocus	980
JFocus	982
Menu	984
Def_Area_Border	986
Def_Group_Border	988
CFlags	990

活動状態の選択対象 1000

Button	1002
SFlags 1004	Active 1006

共通選択対象へ

事象待ち行列 1010

Ifupc 1012	Shift 1014
Event1 1016	Event2 1018

BVIEへ (フォントデータ)

領域へ (キーボード・フォーカス付き)

グループへ (キーボード・フォーカス付き)

共通選択対象へ (キーボード・フォーカス付き)

マウス構造へ (フォーカス状態のホットスポットに対して)

共通選択対象へ (現在のメニュー・フォーカス)